Instruction Manual

DIGITAL PRINTER

VP-491CA

National

DIGITAL PRINTER

VP-491CA

1/17 4G-88-4026

CONTENTS

Page

Instructions

Chapter 1 Performance

1.1 Outline 1

1.2 Electrical Characteristics 1

1.3 Mechanical Characteristics 3

Chapter 2 Operating Instructions

2.1 Description of Front Panel 7

2.2 Description of Rear Panel 9

2.3 Operating Instructions 9

INSTRUCTIONS

Before Using the Machine:

Immediately after unpacking the instrument, check it for any damage which might be caused in the course of transportation. We are making every effort to prevent the instrument breakdown during the transportation. In the vent there is any damage on the panel or package, please notify the dealer from which you have purchased the instrument.

Instructions on Use:

1) Make sure that the source voltage used is within the following limit:
   85V to 100V/50Hz or 60Hz

2) Never install the instrument in any other manner than specified.
   In installing the instrument,
   a. Place the instrument on the horizontal surface on the desk with the instrument base down.
   b. Place the tilt stand upright and bring up the front panel side, and mount the instrument on the desk.
   c. Mount the instrument horizontally on the rack.

3) In operating the instrument, follow the instructions mentioned below.
   a. In mounting the ribbon unit, set the ribbon in an unloosened these state.
   b. Don't operate the instrument unloaded without any paper inserted. Otherwise, the ribbon may be entangled with the drum, resulting in the instrument breakdown.
   c. Use the printing paper designated by our company or of equivalent quality and size. If the paper is unsuitable, the shortage of paper thickness or difference in coefficient of friction may lead to an ill-fed condition of the paper and the fuzz of the paper is accumulated, often causing a failure in mechanism of the instrument.

INSTRUCTIONS

Before Using the Machine:

Immediately after inspecting the instrument, check it for any damage which might be caused in the course of transportation. We are making every effort to prevent the instrument breakdown during the transportation. In the rare there is any damage on the panel or package, please notify the dealer from which you have purchased the instrument.

Instructions on Use:

1) Make sure that the source voltage used is within the following limit:
   85V to 130V, 50Hz or 60Hz

2) Never install the instrument in any other manner than specified in installing the instrument.
   a. Place the instrument on the horizontal surface on the desk with the instrument base down.
   b. Place the tilt stand upright and bring up the front panel side, and mount the instrument on the desk.
   c. Mount the instrument horizontally on the rack.

3) In operating the instrument, follow the instructions mentioned below.
   a. In mounting the ribbon unit, set the ribbon in an unloosened three state.
   b. Don't operate the instrument unloaded with any paper inserted. Otherwise, the ribbon may be entangled with the drum, resulting in the instrument breakdown.
   c. Use the printing paper designated by our company or of equivalent quality and size. If the paper is unsuitable, the shortage of paper thickness or difference in sensitivity of friction may lead to an ill-fed condition of the paper and the jams of the paper is accumulated, often causing a failure in mechanism of the instrument.

d. Use the instrument in the environment specified in the specification as follows:

Temperature:	0°C to 50°C
Humidity:	80% or lower (relative humidity)

e. When there occurs an abnormal noise or trouble in the instrument, immediately stop the instrument operation and notify the nearest National electronic instruments dealer.

Instructions on Storage:

Don't store the instrument in a place high in temperature or humidity or dusty place. When the instrument is left unused for a long period, cover the instrument with the supplied polyethylene protective sheet.

During the storage period, make sure that the temperature in the environment be from -10°C to +60°C. Before reusing the instrument, first adjust the instrument for about 60 minutes at the operating temperature. Especially after the instrument has been stored at a very low temperature, the instrument oil may be solidified and the working resistance of the instrument high, which is likely to cause unsatisfactory revolution.

Chapter 1 Performance

1.1 Outline

The Digital Printer VP-491CA is produced according to the specifications of Anritsu Electric Co., Ltd. and has the following electrical and mechanical characteristics:

1.2 Electrical Characteristics

1.2.1 Characters printed

14 digits

1.2.2 Data input signals

The relation between the data to be input and input signals is as shown in Table 1.
The "0" level required 2.4V to 5.25V, and the "1" level 0 to 0.4V.

	2^3	2^2	2^1	2^0
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
-	1	0	1	0
+	1	0	1	1
.	1	1	0	0
>	1	1	0	1
space	1	1	1	0
*	1	1	1	1

(Table 1)

5/17 4G-88-4026

1.2.3 Data input resistance

10 kΩ or more

1.2.4 Printing command and paper feeding command signals (COM., SPACE)

Voltage level:	A negative pulse which is reduction from the 2.4-to-5.25V range to the 0-to-0.4V range.
Pulse width:	100μs to 1ms
Input resistance:	about 8 kΩ

1.2.5 BUSY signal

An open collector output is produced toin dicate "BUSY".

Tolerable BUSY sinc. current;	16mA or less
Tolerable standby breakdown voltage:	+6V or less

1.2.6 Printing end signal

Voltage level:	a negative pulse from the 2.4V-to-5.25V range to the 0-to-0.4V range
Pulse width:	about 10ms
Tolerable sinc. current:	16mA (in the ON state)

1.2.7 Printing speed:

Two lines of printing and one line of spacing or paper feeding per second on an external instruction.

(Note) The timing of the printing command, paper feed command, BUSY signal and printing end signal is shown in Fig. 1.

1.2.8 Plug

For data input including the various command signals, a couple of 57-40500 should be provided and connected as shown in Fig. 2.

1.2.9 Power Supply

85V to 110V (50 or 60 Hz) for normal operation. (about 50VA/100V, 50Hz)

1.3 Mechanical Characteristics

1.3.1 Outer dimension and weight

200mm wide, 148mm high and 355mm deep excepting knobs and legs. Weight less than 10 Kg.

1.3.2 Color of paint and characters

Panel base:	N-3 semigloss baking
Panel characters:	N-9 silk printing (5R4/14 for N mark)
Outside paint:	N-3 leather toneb aking

1.3.3 Printing drum

Types:	SEIKO standard types

1.3.4 Paper

Roll:	Width 90mm, rolled-up dia. 60mm or less
Fold:	Width 90mm

1.3.5 Equipment

Items	Q'ty	Remarks
Paper	10 rolls	folded paper
Ink ribbon	1	
Spare fuse	5	midget type
Data cable	2	with connecters at both ends
Instruction manual	3 copies	incl. circuit diagrams
Statement of test results	3 copies	

1.3.6 Vibration resistance

The instrument should operate normally after being subjected to vertical, lateral and forth-and-back vibrations each for 30 minutes at the vibrating frequency of 120-160-120 cpm at full amplitude of 2 mm.

1.3.7 Shock resistance

The instrument should normally operate without any abnormal change in outside appearance after dropping it 3 times on the floor of hard wood or concrete from a point where the instrument bottom is 5 cm high from the floor.

1.3.8 Working temperature and humidity

Temperature: 0°C to 50°C

Maximum humidity: 80% (relative humidity)

8/17 4G-88-4026

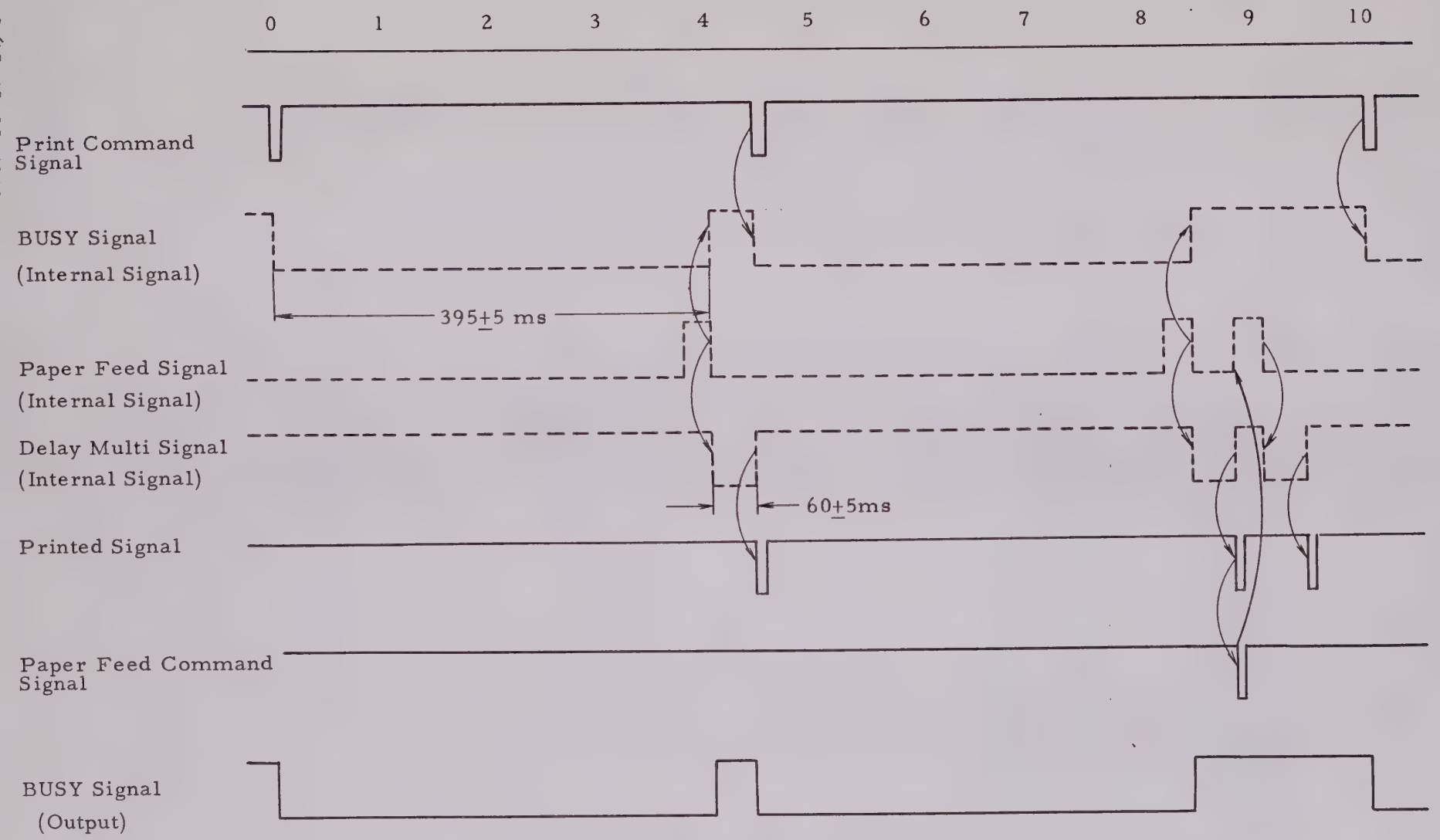


Fig. 1 Timing Diagram of Printing Control Signals

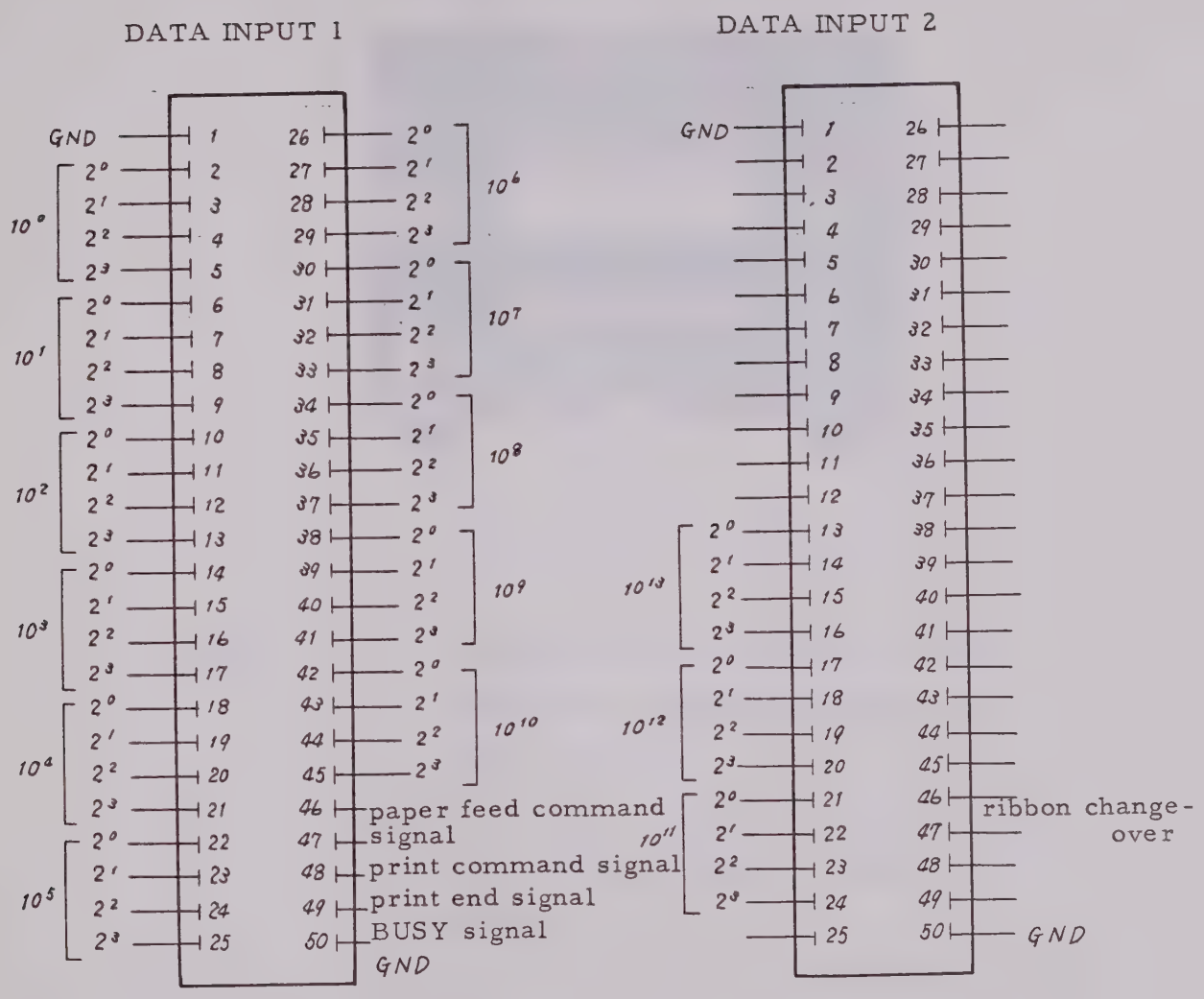
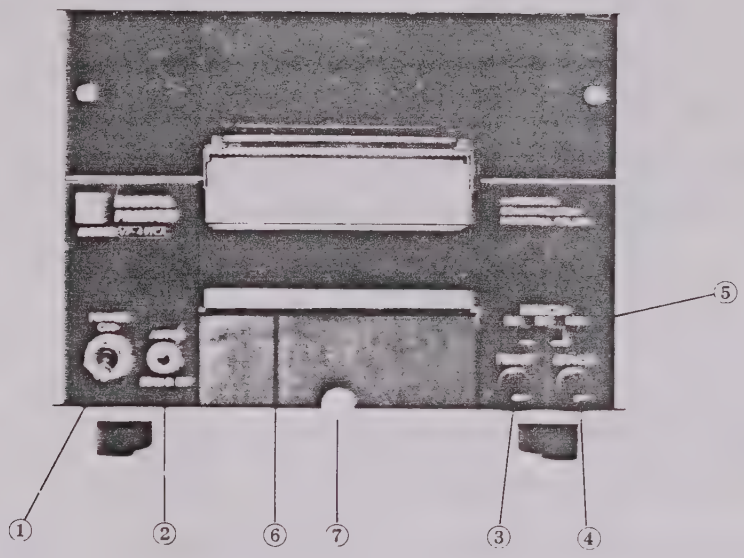


Fig. 2 Connecter Wiring

Chapter 2 Operating Instructions

2.1 Description of Front Panel



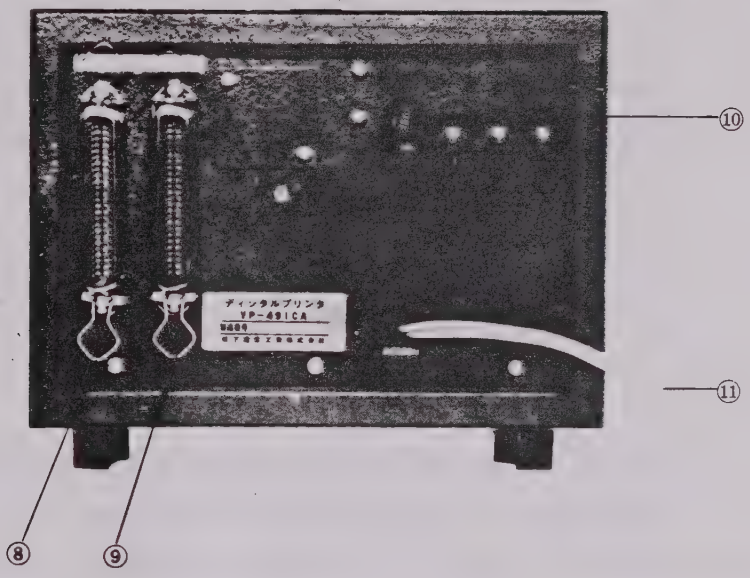
1 POWER — This is a switch for tuning on and off the power supply. When switched on, the printing drum rotates.

2 AUTO-STAN'BY: — This switch is used for insertion or interruption of print command signals during printing.
In the AUTO position, a print command signal from the external signal source is connected directly to the control circuit inside the printer and printing continues. In theSTAN'BY position, the print command signal is interrupted and printing stops. However, when the PRINT button is pressed at this time, one printing is possible for each press of the button.

11/17 4G-88-4026

3	PRINT:	This switch is for manual insertion of the print command signals. Each time the button is pressed, one printing takes place.
4	SPACE:	This switch is for manual feeding of the paper. When this button is pushed, the paper moves rapidly at a rate of more than 5 lines per second. (Set the AUTO-STAN'BY switch at the STAN'BY position.)
5	RIBBON:	This switch is for changing the ribbon color. In the middle EXT position, the ribbon color can be controlled from the external. Signal application will be explained in section 2.6.
6	Paper Holder:	The folded paper is contained in the paper holder.
7	Lock Screw:	This screw is for locking the paper folder containing the folded paper. The screw is loosened by turning counterclockwise and pulled out together with the drawer. (The drawer is pulled out with the screw attached to the case.

2.2 Description of Rear Panel



8 9 DATA INPUT: This is a connector for connecting data to be printed. The connector uses 57-40500. For electrode wiring, refer to Fig. 2 in the section PERFORMANCE.

10 PUSE: A midget fuse of 1A is used.

11 A parallel two-core code for power supply.

2.3 Operating Instructions

2.3.1 Mounting Ribbon Unit

Remove the acryl panel on the upper part of the front panel by turning counterclockwise two knurl knob lock screws.

Insert the ribbon unit (which is contained in the equipment box at the time of packaging) and set the ribbon in the manner shown in the drawing.

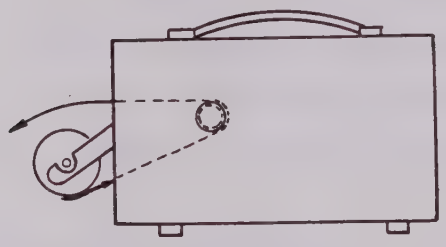
After acertaining the operation of the instrument according to the instructions mentioned below, mount the acryl panel.

2.3.2 Paper Insertion

New paper is loaded in the steps mentioned below.

(1) In order to facilitate the insertion of paper, cut the paper at both corners or in the shape of a hill as shown below. Tearing with the hand to a point is sufficient.

(2) Insert the paper in the insertion port at the bottom of the panel. The paper is wound from about the 10 cm position after insertion. At this time, the roll is turned in the counter-clockwise direction as shown below.



(3) With the printer power supply on, press the SPACE button. When the paper is completely inserted, it fits on the roll and will come out from the top.

(4) When the paper does not pass through the bottom side of the cutter properly, release the SPACE button and stop the paper. After pulling the cutter toward you, return the cutter when the paper passes through the bottom of the cutter.

(5) When the roll becomes small, the paper will pass easily when inserted in the printer if the curve of the paper roll is made somewhat larger.

(6) When it is difficult to feed the paper, the roll can be removed from the paper holder. After the paper passes upward, attach the roll again to the holder.

(7) Folded paper can be inserted in the drawer on the lower center part of the panel. When the paper is inserted, pull out the drawer completely, follow steps (1) to (4) above and push the drawer in. The paper can then be supplied in the printer.

(8) After inserting the paper, make sure that the paper is placed between the drum and the ink ribbon and conduct the printing test.

2.3.3 Printing Test

The test is conducted without connecting signals to DATA INPUT. Turn the POWER switch on and set the AUTO-STAN'BY switch at STAN'BY. Under this condition, push the PRINT button and * marks are printed on all of the 14 positions.

2.3.4 Signal Connection and Printing

Specified signals are connected to DATA INPUT 1, 2 respectively. (Refer to the connecter wiring diagram in Fig. 2, Chapter 1.)

Turn POWER switch on, and set the AUTO-STAN'BY at AUTO. This condition indicates the awaiting of the arrival of the printing command signal, so that one printing is made in response to that signal.

The paper is fed by one line automatically with one printing. It can also be fed by any desired number of lines in response to an external signal or by pushing the manual SPACE button.

(Note) Make sure to set the AUTO-STAN'BY switch at STAN'BY during the feeding of the paper as the instrument will print by mistake if it is set at AUTO upon the arrival of a printing command.

2.3.5 Changing Printing Color

The Digital Printer VP-491CA is provided with ink ribbons of two colors, red and black. It will print black when the RIBBON switch on the panel is set at BLK and red when it is set at RED.

The ribbon color changeover can be effected by remote control, in which case;

(1) Set the RIBBON switch at the lower right of the panel at the central EXT.

(2) The ribbon will be changed to red by applying a voltage of +3 to +10V to No. 46 of DATA INPUT 2 of the 50-pole connecter on the rear panel.

(3) By contrast, the ribbon will change to black if a voltage of +0.5V to 0V is applied to No. 46.

(4) The ribbon cannot be controlled externally when the RIBBON switch is set at BLK or RED.

2.3.6 Changing the Ribbon

The ribbon can be used for printing 10,000 to 30,000 lines. When the ribbon loses the power to make clear characters after extended use, replace it by the following steps.

(1) Loosen the two right and left screws on the acryl resin plate on the upper part of the front surface and remove the plate.

(2) While pushing lightly the black knobs on both sides of the ribbon holder (as indicated by white arrows), pull out the holder.

(3) If ribbon is difficult to change, remove the lock by pushing the ribbon holder down further and the entire ribbon holder can be pulled out toward you.

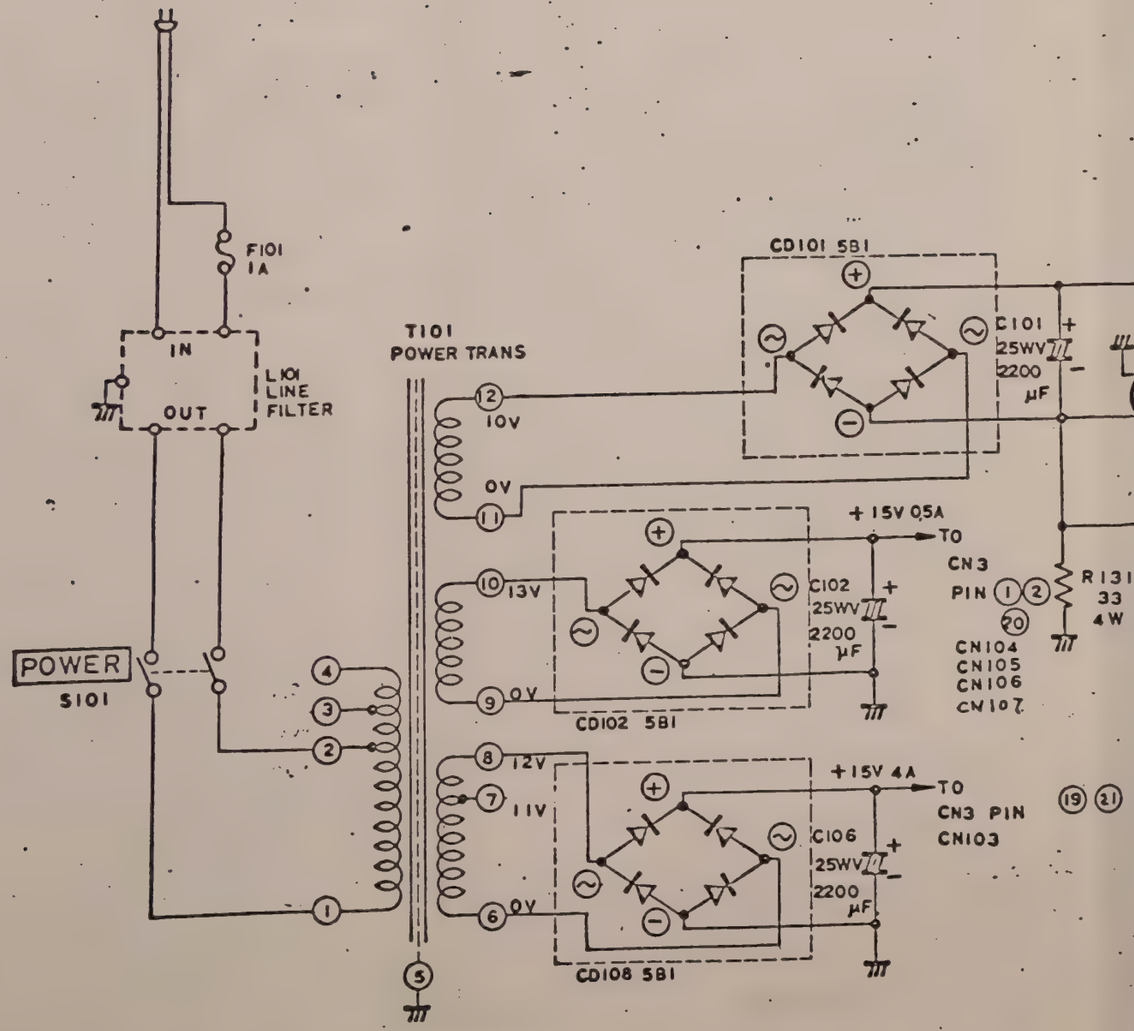
(4) The method of attaching the ribbon is shown on the aluminum plate stuck on the holder.
Be sure that the black and red directions are not reversed. Otherwise, the black ribbon position will print out red letters, and vice versa.

(5) After the ribbon has been attached correctly, insert the holder in the reverse procedures and attach the acryl resin plate with the screws.

(6) Spare ribbon is available as an ordinary typewriter ribbon at local stationery shops.

17/17 4G-88-4026

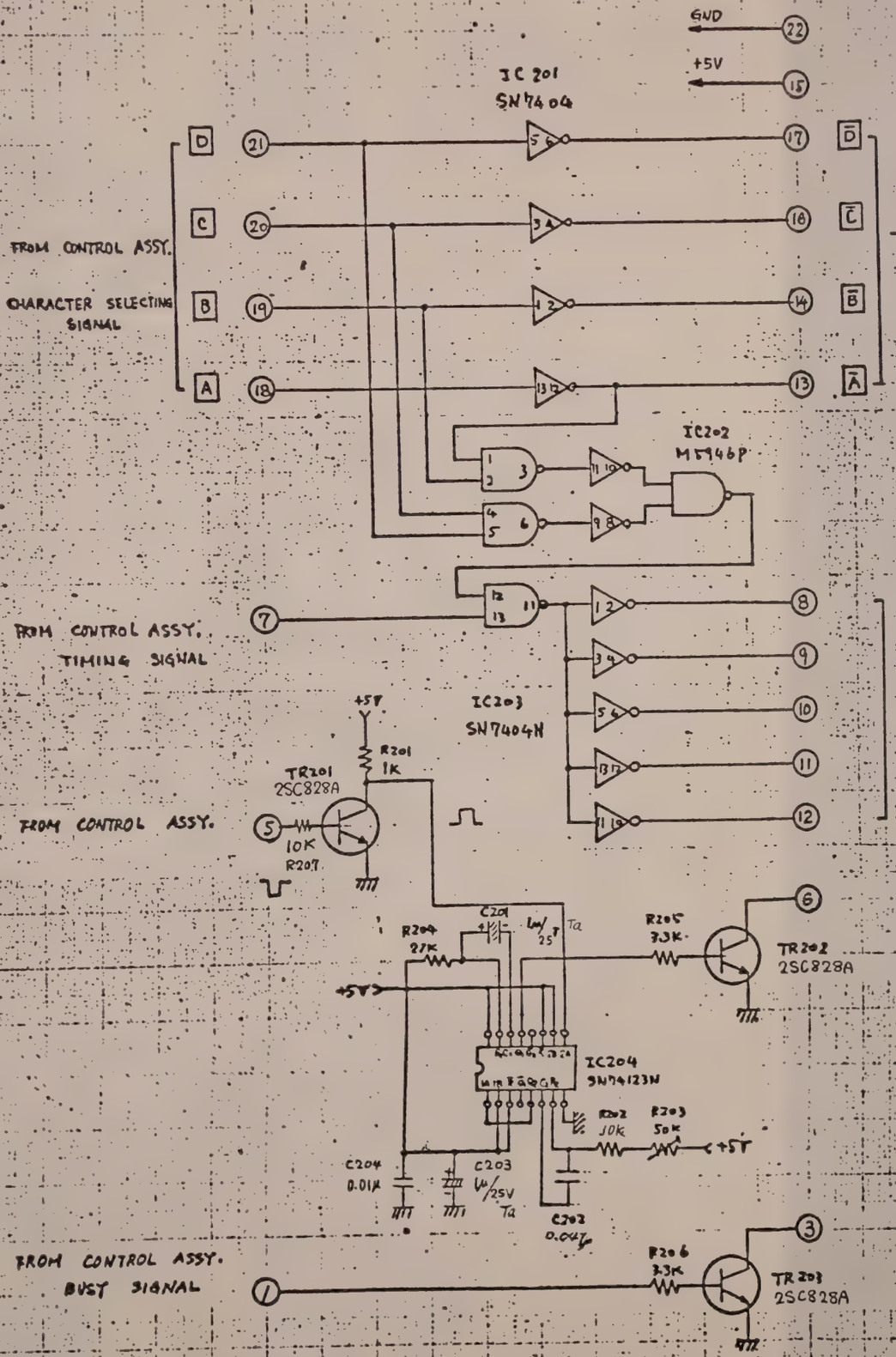
	NOT USED
C101~C110	C107.109
CD101~CD108	—
R101~R135	R119~123.131~134
TR101~TR109	—
IC101	—



1. RESISTANCE VALUES IN Ω, 1/4 WATT AND CAPACITANCE IN PF UNLESS OTHERWISE SPECIFIED.

VP-491CA

POWER & RESET



NEGATIVE LOGIC INVERTER VP-491CA

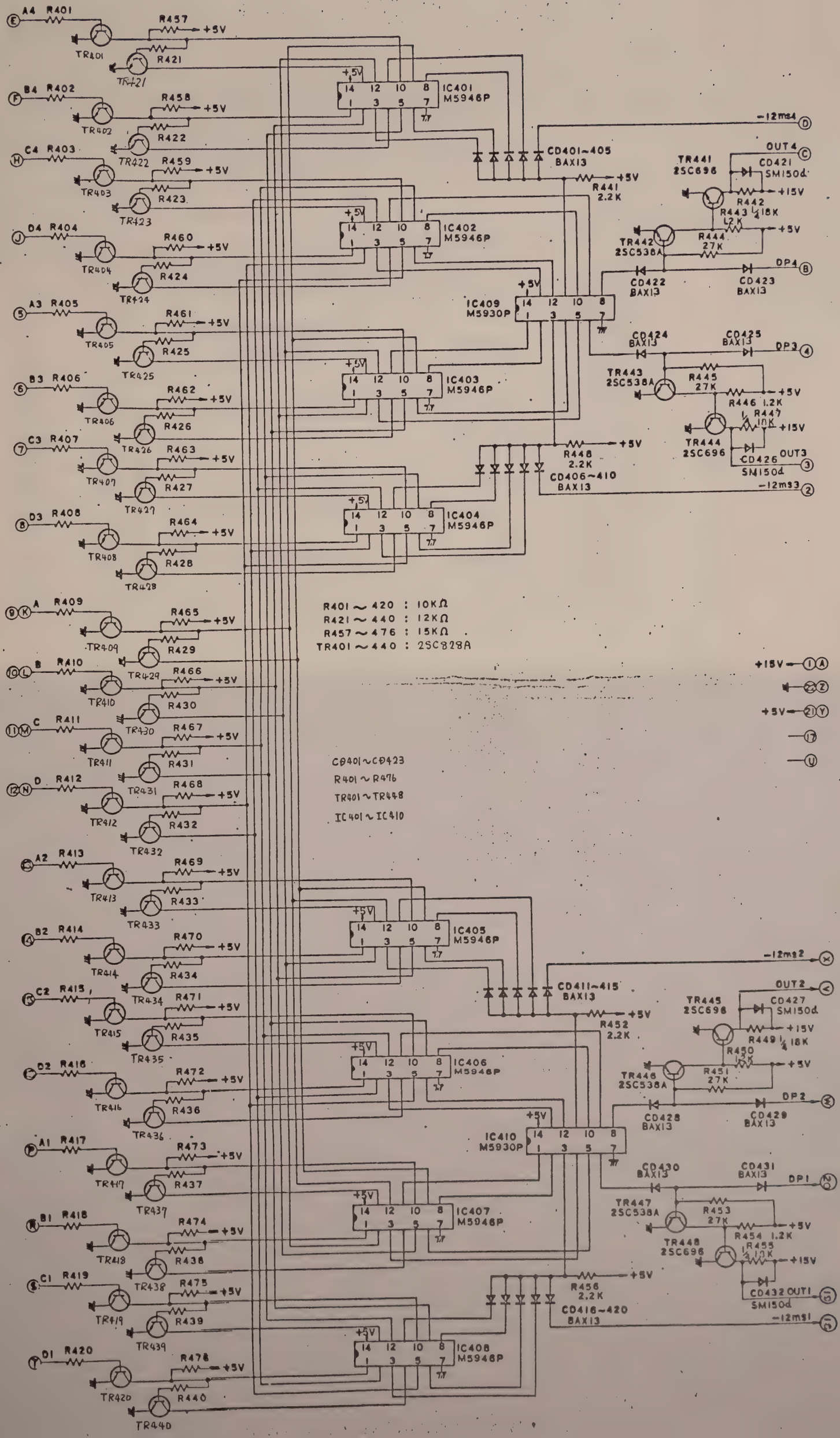
	NOT USED
C301 ~ C328	C301. 303. 304. 306. 317. 318. 326. 327
D304 ~ D317	D306. 307. 312 ~ 314
R301 ~ R386	R305. 311. 312. 334. 339. 340 ~ 344. 362 ~ 370
TR304 ~ TR328	TR 309. 316 ~ 322
IC301 ~ IC312	—

TR303 B
TR302 B
TR303 C
TR302 C
+15
RIBBON
S105 COM
COMMAND
SPACE
STAND BY
PRINT
TO NEGATIVE LOGIC INVERTER
CHARACTER PULSE
timing pulse
TIMING PULSE
BCD—C
SPACE
CONTROL
EXT SPACE
RESET
BUSY
A
B
C
D
VP-491CA

	GND	Vcc
M5953	7 pin	14 pin
M5946	〃	〃
M5936	〃	〃
SN74107	〃	〃

2SC828 : TR304. 307. 308. 310. 311 313 ~ 315. 323 ~ 328.

RESISTANCE VALUES IN Ω, 1/8 WATT AND CAPACITANCE IN PF UNLESS OTHERWISE SPECIFIED


A4 R401
B4 R402
C4 R403
D4 R404
A3 R405
B3 R406
C3 R407
D3 R408
A R409
B R410
C R411
D R412
A2 R413
B2 R414
C2 R415
D2 R416
A1 R417
B1 R418
C1 R419
D1 R420
R457 +5V
R458 +5V
R459 +5V
R460 +5V
R461 +5V
R462 +5V
R463 +5V
R464 +5V
R465 +5V
R466 +5V
R467 +5V
R468 +5V
R469 +5V
R470 +5V
R471 +5V
R472 +5V
R473 +5V
R474 +5V
R475 +5V
R476 +5V
TR401
TR421
TR402
TR422
TR403
TR423
TR404
TR424
TR405
TR425
TR406
TR426
TR407
TR427
TR408
TR428
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R426
R427
R428
R429
R430
R431
R432
R433
R434
R435
R436
R437
R438
R439
R440
IC401 M5946P
IC402 M5946P
IC403 M5946P
IC404 M5946P
IC405 M5946P
IC406 M5946P
IC407 M5946P
IC408 M5946P
IC409 M5930P
IC410 M5930P
CD401~405 BAX13
CD406~410 BAX13
CD411~415 BAX13
CD416~420 BAX13
R441 2.2K
R448 2.2K
R452 2.2K
R456 2.2K
-12ms4
-12ms3
-12ms2
-12ms1
TR441 2SC696
TR442 2SC538A
TR443 2SC538A
TR444 2SC696
TR445 2SC696
TR446 2SC538A
TR447 2SC538A
TR448 2SC696
CD421 SM150d
CD422 BAX13
CD423 BAX13
CD424 BAX13
CD425 BAX13
CD426 SM150d
CD427 SM150d
CD428 BAX13
CD429 BAX13
CD430 BAX13
CD431 BAX13
CD432 SM150d
R442
R443 1/4 18K
R444 27K
R445 27K
R446 1.2K
R447 1/4 10K
R449 1/4 18K
R450 1/4 10K
R451 27K
R453 27K
R454 1.2K
R455 1/4 10K
+15V
OUT4
OUT3
OUT2
OUT1
DP4
DP3
DP2
DP1
R401~420 : 10KΩ
R421~440 : 12KΩ
R457~476 : 15KΩ
TR401~440 : 2SC828A
CD401~CD423
R401~R476
TR401~TR448
IC401~IC410
+15V
-12ms4
-12ms3
-12ms2
-12ms1
VP-491CA
DATA INPUT
RESISTANCE VALUES IN Ω, 1/4WATT
UNLESS OTHERWISE SPECIFIED.

CN1

DATA INPUT 1

DATA INPUT 2

CN2

EXT RIBON CONTROL (CN2 PIN 46)

RED : +0.5V ~ +5V (HIGH LEVEL)

BLK. : +0.5V ~ 0V (LOW LEVEL)

DIGITAL PRINTER EP-101

RIBBON

SPACE

MOTOR

CHARACTER MAGNET

RESET MAGNET

CN 3

CHARACTER PULSE

RESET

+15V C106

+15V FROM C102

GND

+5V

CN101

CN102

CN103

CN104

CN105

CN106

CN107

+15V FROM C102

FUSE 1A

LINE FILTER

S101

CD102 5B1

C101 25WU 2200μF

C102 25WU 2200μF

C106 25WU 220μF

+15V 4A TO CN102

R131 33 4W

BLACK

EXT

RED

+5V

S102

S103

S104

AUTO

STANBY

PRINT

SPACE

TR101 2SD92

RIBBON TR302 2SD92

SPACE TR303 2SD92

VP-491C A MOTHER SCHEMATIC DIAGRAM

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